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PATENT ABSTRACTS OF JAPAN

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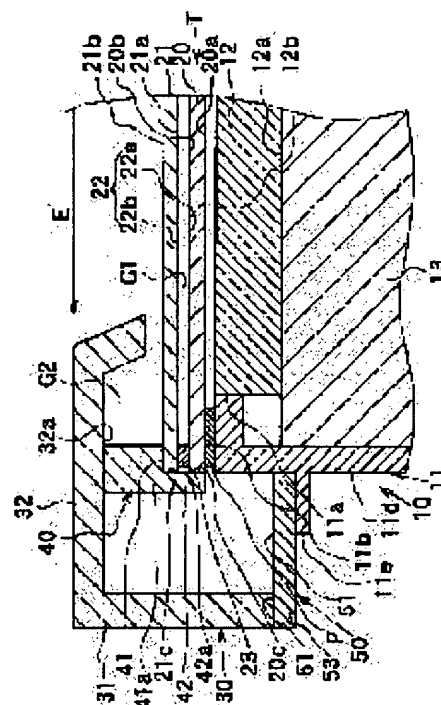
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(54) DISPLAY DEVICE PROVIDED WITH TOUCH PANEL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a liquid crystal display device provided with a touch panel for preventing the touch panel T from being moved from a liquid crystal display device main body.

SOLUTION: This device is provided with the liquid crystal display device main body 10, the touch panel T and a cover member 30 annularly extended from the outer wall 11d of the liquid crystal display device main body 10 so as to cover the outer peripheral part of the touch panel. Then, the cover member 30 faces the outer peripheral part of the touch panel T from the side of the surface 21b at the extended part 32. Then, a spacer 40 disposed between the extended part 32 of the cover member 30 and the outer peripheral part of the touch panel T is provided. Thus, the outer peripheral part of the touch panel T is held immovably in the plate thickness direction by the extended part 32 of the cover member 30 through the spacer 40.



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CLAIMS

[Claim(s)]

[Claim 1] The touch panel which comes to build at least one normally open mold switch (22a, 22b) which adhesion immobilization is carried out at the body of a display (10), and said body of a display, and operates according to the touch actuation to an actuation side (21b) (T), In the display equipped with the touch panel equipped with the covering member (30) which has the annular opposite section (32) which counters the periphery section of said touch panel from the said actuation side side through dead air space (G2) The display equipped with the touch panel characterized by arranging a spacer (40) between said annular opposite section of said covering member, and said periphery section of said touch panel.

[Claim 2] Said spacer is the display equipped with the touch panel according to claim 1 characterized by projecting along the edge (20c, 21c) of said touch panel, and holding said touch panel to migration impossible in the direction of a field.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the display equipped with the touch panel.

[0002]

[Description of the Prior Art] Conventionally, as this kind of an indicating equipment, there are some which were adopted as an object for cash dispensers, for example. This indicating equipment is equipped with the body 1 of an indicating equipment, the touch panel 2, and the covering member 3 as shown in drawing 3 thru/or drawing 5. The body 1 of a display is equipped with case 1a and liquid crystal panel 1b contained by this case, and this liquid crystal panel 1b faces 1d of annular openings of surface 1c of case 1a in that screen 1e.

[0003] The touch panel 2 is equipped with substrate 2a arranged along with 1d of annular openings of case 1a, and substrate 2c arranged along with surface 2b of this substrate 2a as shown in drawing 5. Among both [these] the substrates 2a and 2c, annular spacer 2d which forms the plane gap G1 is arranged, and it is located this spacer 2d between the periphery section of surface 2b of substrate 2a, and the periphery section of 2f of rear faces of substrate 2c.

[0004] The touch panel 2 is equipped with normally open mold switch 2e, and this normally open mold switch 2e is equipped with 2g of film-like contact members formed along 2f of rear faces of substrate 2c, and 2h of film-like contact members currently formed along with surface 2b of substrate 2a. Here, substrate 2c bends according to the touch actuation to the part corresponding to 2g of the film-like contact member. Based on bending of the substrate 2c concerned, 2g of film-like contact members contacts 2h of film-like contact members. One of these and substrate 2c return to a pattern according to discharge of the above-mentioned touch actuation. Based on a return in the pattern of substrate 2c, 2g of film-like contact members dissociates from 2h of film-like contact members. Thereby, the both film-like contact members 2g and 2h function as normally open mold switch 2e.

[0005] The annular covering 3 is formed so that it may extend from 1f of side faces of case 1a and the periphery section may be covered through dead air space G2 among surface 2k of substrate 2c. The basis in which this dead air space G2 was formed is for avoiding malfunction of normally open mold switch 2e by the contact to a touch panel 2 from the annular covering 3. For this reason, the touch panel 2 is being fixed to the periphery section of surface 1c of a case 1 only with the double-sided tape 5 in the periphery section of 2m of rear faces of substrate 2a.

[0006]

[Problem(s) to be Solved by the Invention] With the above-mentioned display, it is being fixed to the periphery section of surface 1c of a case 1 by only the double-sided tape 5 like **** in the periphery section of 2m of rear faces of substrate 2a. For this reason, when the above-mentioned indicating equipment is carried in an automobile as for example, an object for car navigation, the holding power of the touch panel according [the vibration from the engine of the automobile concerned etc.] to the double-sided tape to propagation and a case falls to the above-mentioned indicating equipment. Therefore, there is fault that a touch panel moves from a case.

[0007] Then, this invention aims at offering the indicating equipment equipped with the touch panel it was made for a touch panel not to move from the body of an indicating equipment using the periphery section of a touch panel paying attention to the normally open mold switch not being built in in the periphery section of a touch panel.

[0008]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, it sets to invention given in claims 1 and 2. The touch panel which comes to build at least one normally open mold switch (22a, 22b) which adhesion immobilization is carried out at the body of an indicating equipment (10), and the body of an indicating equipment, and operates according to the touch actuation to an actuation side (21b) (T), It has the covering member (30) which has the annular opposite section (32) which counters the periphery section of a touch panel from the actuation side side through

dead air space (G2). And the spacer (40) was arranged between the annular opposite section of a covering member, and the periphery section of a touch panel.

[0009] Thereby, a touch panel is held by the annular opposite section of a covering member in the direction of board thickness through a spacer at migration impossible in the periphery section. For this reason, even if vibration is transmitted to an indicating equipment, a touch panel does not move in that direction of board thickness from the body of an indicating equipment. moreover, invention according to claim 2 -- setting -- a spacer -- the edge (20c, 21c) of a touch panel -- meeting -- projecting -- a touch panel -- the direction of a field -- migration impossible -- maintenance -- it is like. For this reason, even if vibration is transmitted to an indicating equipment, a touch panel does not move in that direction of a field from the body of an indicating equipment.

[0010]

[Embodiment of the Invention] Hereafter, the operation gestalt which shows this invention in drawing is explained. Drawing 1 and drawing 2 show 1 operation gestalt of the liquid crystal display for cars equipped with the TAITCHI panel T concerning this invention. The liquid crystal display is equipped with the body 10 of a liquid crystal display as shown in drawing 1 and drawing 2, and this body 10 of a liquid crystal display is equipped with the case 11. The body 10 of a liquid crystal display is equipped with the liquid crystal panel 12 and back light 13 which were contained by the case 11 as shown in drawing 2. The liquid crystal panel 12 has faced annular opening 11a of a case 11 in that screen 12b, and this annular opening 11a is formed in the center section of surface 11b of a case 11.

[0011] Moreover, a back light 13 carries out incidence of the sheet-like light to a liquid crystal panel 12 from rear-face 12a. In addition, a switch S1 thru/or S9 show the actuation switch of various actuator machines, such as an air conditioner and car navigation, by drawing 1. The touch panel T is arranged along with annular opening 11a of a case 11, and this touch panel T is equipped with both the substrates (transparence glass) 20 and 21 and a spacer 23 as shown in drawing 2. The substrate 20 is arranged along with annular opening 11a of a case 11 in that rear-face 20a, and this substrate 20 is being fixed to the periphery section of surface 11b of a case 11 by double-sided tape P in the periphery section of that rear-face 20a.

[0012] The substrate 21 is arranged through the spacer 23 along with surface 20b of a substrate 20 in that rear-face 21a, and through the spacer 23, rear-face 21a of this substrate 21 is being fixed to surface 20b of a substrate 20 as it is also with a binder. A spacer 23 is located between the periphery section of rear-face 21a of a substrate 21, and the periphery section of surface 20b of a substrate 20. A spacer 13 forms the plane gap G1 among both the substrates 20 and 21.

[0013] The touch panel T is equipped with the normally open mold switch 22, and this normally open mold switch 22 is equipped with the both transparent membrane-like contact members (product made from indium oxide) 22a and 22b. Film-like contact member 22a is formed along with surface 20b of a substrate 20, and film-like contact member 22b is formed along with rear-face 21a of a substrate 21. The both film-like contact members 22a and 22b counter mutually, and are arranged, the both [these] film-like contact members 22a and 22b are here where it is located corresponding to screen 12b of a liquid crystal panel 12, and a substrate 21 bends according to the touch actuation to the part corresponding to the film-like contact member 22b. Based on this bending, film-like contact member 22b contacts film-like contact member 22a. One of these and a substrate 21 return to a pattern according to discharge of the above-mentioned touch actuation. Based on a return in this pattern, the film-like contact member 21 dissociates from film-like contact member 22a. Thereby, the both film-like contact members 22a and 22b function as a normally open mold switch 22.

[0014] In addition, it connects with the electric wiring arranged along with surface 20b of a substrate 20, and gets down from both film-like contact member 22a, and both film-like contact member 22b is connected to the electric wiring arranged along with rear-face 20a of a substrate 21. Moreover, the touch panel is adopted as actuation switches, such as audio equipment. Sign E shows the actuation area (active area) of a touch panel by drawing 2.

[0015] This covering member 30 is equipped with the extension section 31 and the annular section 32 as the liquid crystal display is equipped with the covering member 30 as shown in drawing 1 and drawing 2, and shown in drawing 2. Extension formation of the extension section 31 is carried out in drawing 2 in the illustration upper part (touch panel T side) from the edge 52 of the front face 51 of the annular printed circuit board 50, and the annular section 32 is formed so that the periphery section of surface 21b may be countered [from the toe of the extension section 31] through dead air space G2 with a wrap in the periphery section of surface 21b of a substrate 21.

[0016] The printed circuit board 50 is annularly formed so that 11d of side faces of a case 11 may be surrounded, and this printed circuit board 50 is being fixed to annular extension section 11e from 11d of side faces of a case 11 with that rear face 53. The liquid crystal display is equipped with the spacer 40, from wall 32a of the annular section 32 of the covering member 30, towards the substrate 21 side, it projects and this spacer 40 is formed, as shown in drawing 2. As shown in drawing 1, the spacer 40 is formed along with the periphery section of a substrate 21, and as this spacer 40 is

shown in drawing 2 , it touches the periphery section of surface 21b of a substrate 21 in that substrate 21 side-edge section 41.

[0017] The spacer 40 has the lobe 42 which projects along the side faces 20c and 21c of both the substrates 20 and 21 from lateral part 41a of that substrate 21 side-edge section 41, and this lobe 42 touches the side faces 20c and 21c of both the substrates 20 and 21 in that side-face 42a. In addition, the spacer 40 is really fabricated with the same ingredient as the covering member 30.

[0018] As explained above, from wall 32a of the annular section 32 of the covering member 30, a spacer 40 projects, and is formed towards the substrate 21 side, and this spacer 40 touches the periphery section of surface 21b of a substrate 21 in that substrate 21 side-edge section 41. Thereby, a touch panel T is held by the extension section 32 of the covering member 30 from the body 10 of a liquid crystal display in the direction of board thickness through a spacer 40 at migration impossible in the periphery section.

[0019] In addition, the lobe 42 of a spacer 40 touches the side faces 20c and 21c of both the substrates 20 and 21 in the side-face 42a like ****. For this reason, a touch panel T is held from the body 10 of a liquid crystal display in that direction of a field at migration impossible. For this reason, even if vibration is transmitted to a liquid crystal display from the engine of the car concerned etc., a touch panel does not move in that direction of a field, and its direction of board thickness from the body 10 of a display.

[0020] Moreover, since migration in the direction of board thickness and the direction of a field was prevented for the touch panel T to the case 11 like ****, it can control that the covering member 30 bends according to vibration of a car. For this reason, the gap G2 between wall 32a of the annular section 32 of the covering member 30 and surface 21b of a substrate 21 can be secured. Consequently, generating of the allophone by contact to wall 32a of the annular section 32 of the covering member 30 and surface 21b of a substrate 21, as a result malfunction of a touch panel T can be prevented.

[0021] Furthermore, since the covering member 30 arranged the spacer 40 along with the periphery section of surface 21b of a substrate 21 like ****, a foreign matter can prevent invading into a printed circuit board 50 side from a gap G2. For this reason, the electric short circuit by the foreign matter in the electrical circuit object carried in the printed circuit board 50 can be prevented. In addition, although the above-mentioned operation gestalt explained the covering member 30 per [which formed the spacer 40 along with the periphery section of surface 21b of a substrate 21] example, what is necessary is just edges of surface 21b of a substrate 21, such as a corner of surface 21b of not only this but the substrate 21.

[0022] Moreover, you may make it adopt it as the mobile which has the source of vibration of a vessel, a train, the aircraft, etc. in addition to an automobile in operation of this invention. Moreover, you may make it fabricate not only this but the covering member 30 and spacer 40 which were explained per [the covering member 30 and the spacer 40 were really fabricated] example on another object with the above-mentioned operation gestalt.

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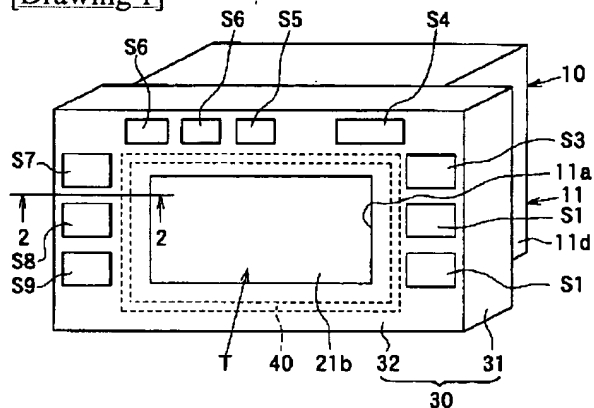
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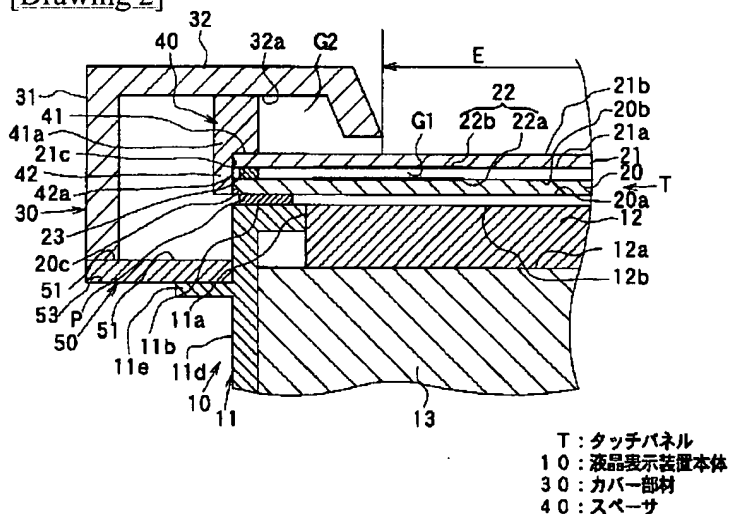
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DRAWINGS

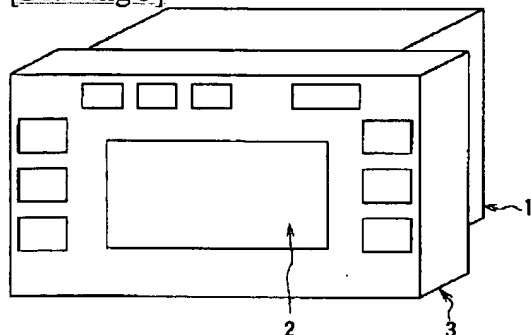
[Drawing 1]



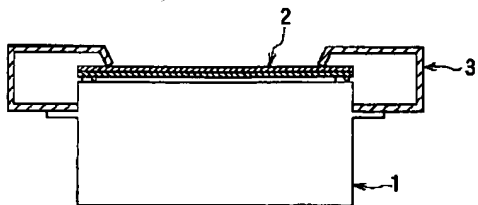
[Drawing 2]



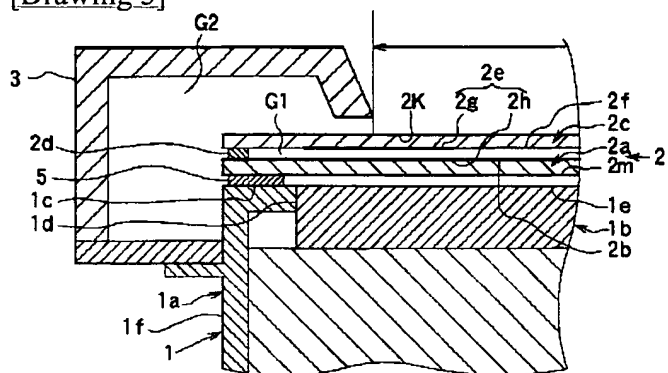
[Drawing 3]



[Drawing 4]



[Drawing 5]



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